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Via Facsimile (6 pages) & Confirmation by DHL (+ 43 1 53424 200)

Re: International Patent Application No. PCT/KR2003/000883  
Applicant: SK CHEMICALS CO., LTD  
Our Ref: OPP030280KR

Dear Sirs:

The Applicant, who received the Written Opinion relating to the above identified International Application transmitted on May 5, 2004, hereby files the amendment under Article 34 and the response as in the attached sheets.

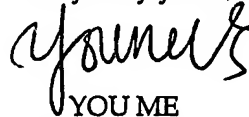
In the Amendment, the Applicant hereby cancels (sheet No. 23 and 24) because the intended amendment results in the cancellation of some claims therein. In respect of each claim appearing in the international application based on the replacement sheets submitted herewith, and in accordance with PCT Section 205, the following claim(s) are:

- (i) unchanged: 2, 3, 4, 5, 6
- (ii) amended: 1, 7

Also, the Applicant files as attached herewith a brief statement explaining the amendment and indicating any impact that amendment therein might have on the description.

Please take into consideration of the description amendment in examining this International Application.

Very truly yours,



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LJH/lka  
Enclosures  
OPP030280IEPOT\_050114.DOC\_LJH/lka

## RESPONSE

We have received a written opinion from the International Preliminary Examining Authority (IPEA) that the present invention lacks novelty and inventive step in view of the documents D1-D5.

D1: WO 1999/018059 A1 "Eastman Chemical Company, 1999.04.15"

D2: WO 2003/022791 A1 "Lonza Spa, 2003.03.20"

D3: US 5183933 A1 "Jon J. Harper et al., 1993.02.20"

D4: US 4950786 A1 "Paul A. Sanchez et al., 1990.08.21"

D5: JP 06 279356 A2 "Mitsubishi Petrochemical Co. Ltd, 1994.10.04"

### 1. Amendment

In response to the written opinion mailed on May 05, 2004, applicants respectively requests entry of the following amendment:

### IN THE CLAIM

Please amend the claims as follows:

1. (Amended) A method for the preparation of naphthalene dicarboxylic acid by oxidizing dimethylnaphthalene with oxygen in air in the presence of acetic acid solvent using the metal catalysts of cobalt and manganese, and using bromine as a reaction initiator,

wherein said oxidizing reaction is carried out in the range of 155 to 180 °C with adding a gas selected from the group of nitrogen

gas, off-gas and a mixture thereof into upper portion of a reactor,  
which the off-gas has oxygen with low concentration by pre-oxidation.

7. (Amended) The method for the preparation of naphthalene dicarboxylic acid of claim 1, wherein the weight ratio of said air to dimethylnaphthalene is 4:1 to 15:1.

## **2. Comments**

Reconsideration of the pending claims is respectfully requested in view of the above amendments and the following comments.

The Examiner cited that this invention is lacked in novelty and inventive step on the basis of D1 to D5 which disclose a process for the oxidation of 2,6-dimethylnaphthalene to 2,6-naphthalenedicarboxylic acid using cobalt, manganese and bromine as catalysts and acetic acid as solvent.

This invention differs from the cited documents which is silent on the use of off-gas described in revised claim 1.

It is not necessary to consider on D2, since the filing date of the cited D2 is behind time of the priority date of this invention and D2 has published prior to the international filing date of this invention, even though D2 suggests the use of nitrogen for the regulation of the oxygen content.

The off-gas suggested by this invention means a sort of air having with low concentration of oxygen by pre-oxidation, however, the oxygen of D5 is pure O<sub>2</sub> gas being able to mixing with nitrogen. Therefore, the combination

nitrogen with oxygen of D5 has remarkable contrast a mixture of nitrogen and off-gas of this invention in terms of the concentration of oxygen.

However, this invention has an advantage of preventing a risk of explosion inside a reactor owing to excess oxygen using off-gas. On the contrary, all of the cited documents don't consider the risk of explosion and solution thereof at all.

As described in the above, it is obvious that this invention has novelty and inventive step in view of D1 to D5, and we respectfully request the Authority's reconsideration in this matter.

**WHAT IS CLAIMED IS:**

1. (Amended) A method for the preparation of naphthalene dicarboxylic acid by oxidizing dimethylnaphthalene with oxygen in air in the presence of acetic acid solvent using the metal catalysts of cobalt and  
5 manganese, and using bromine as a reaction initiator,

wherein said oxidizing reaction is carried out in the range of 155 to 180 °C with adding a gas selected from the group of nitrogen gas, off-gas and a mixture thereof into upper portion of a reactor, which the off-gas has oxygen with low concentration by pre-oxidation.

10 2. The method for the preparation of naphthalene dicarboxylic acid of claim 1, wherein said naphthalene dicarboxylic acid is 2,6-naphthalene dicarboxylic acid.

3. The method for the preparation of naphthalene dicarboxylic acid of claim 1, wherein the concentration of said metal catalysts of cobalt and  
15 manganese is 1000 ppm to 6000 ppm in acetic acid.

4. The method for the preparation of naphthalene dicarboxylic acid of claim 1, wherein the molar ratio of said metal catalysts of cobalt and manganese is 2:1 to 25:1.

5. The method for the preparation of naphthalene dicarboxylic acid  
20 of claim 1, wherein the molar ratio of said bromine to the metal catalysts of

cobalt and manganese is 0.1:1 to 0.8:1.

6. The method for the preparation of naphthalene dicarboxylic acid of claim 1, wherein the residence time of said acetic acid and the produced naphthalene dicarboxylic acid in the reactor is 30 to 120 min.

- 5        7. (Amended) The method for the preparation of naphthalene dicarboxylic acid of claim 1, wherein the weight ratio of said air to dimethylnaphthalene is 4:1 to 15:1.